PREVALENCE AND RISK FACTORS OF OSTEOPOROSIS AMONG ELDERLY

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ABSTRACT

Osteoporosis has been labelled as the disease of the 21st century. Osteoporosis is a worldwide disease characterised by reduction of bone mass and alteration of bone architecture resulting in increased bone fragility and increased fracture risk. A prospective observational study was done to assess the prevalence and risk factors of osteoporosis in an adult between 35 to 75 years of age in selected hospital, Idukki. A qualitative research approach used and 46 samples were selected. With prior permission from concerned authority, data was collected followed by informed consent from the participants. BMD was tested with an ultrasound (bone densitometer) and results were statistically measured with SPSS version20. Samples age group was 28.3% (35-50), 4.13% (51-65), 30.4% 9>65). Gender: male 13, (28.3%), and female 33, (71.7%). Majority of them were married (39, 84.8%).47.8% had normal BMI and 66.7% were postmenopausal women. Samples with 47.8% of having osteopenia and 52.2% had osteoporosis. Age, type of family, intake of calcium and vitamin D, sun exposure, menopausal duration and physical activity were associated with osteoporosis. It was statistically significant (p<0.05,CI 95%).

***Key words**: Prevalence, Risk Factors, Osteoporosis, Bone Mineral Density*

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INTRODUCTION

Osteoporosis has been labelled as the disease of the 21st century. In recent years osteoporosis has become a leading cause of morbidity and mortality among elderly women. The great risk is because of the sedentary nature and work option, modern Indians have hardly any exposure. Osteoporosis is a silent disease, because the most visible clinical sign is often the hip fracture. Urbanization and aging population cause a greater disease burden. The majority of fragility fracture patients are neither assessed nor given any treatment. Osteoporosis mainly occurs in post-menopausal women and elderly men. Also the number of men with osteoporosis is lower than the female (Weaver CM, 2019). According to the world health Organization (WHO), osteoporosis is defined as a skeletal bone mineral density that lies 2.5 standard deviation or more below the average value for young healthy women (t score of <-2.5SD) (WHO,1994).

Menopause and advancing age cause an imbalance between reabsorption and formation rate of the bone, thereby increasing the risk of fracture. Various factors are involved in the etiology of osteoporosis among Indian women. Dietary intake is much more important in case of management of osteoporosis. (Mithal, 2014). And also important for mineralization of bones strength. The process of aging is associated with decreased calcium absorption from the gut especially especially in post-menopausal women. (Parker SE, 2014). Vitamin D synthesised by the human skin when it composed to sunlight. Several studies supported that Indians are suffering from Vitamin D deficiency; study reported that in Urban Asian Indian's functionally significant deficiency in Vitamin D affecting BMD at hip was quick prevalent (Vapputari et al, 2006).

The major risk factor for developing osteoporosis is poor nutritional status. Other factors include lack of exercise, inadequate sun exposure, sedentary life style which determinant to bone health. Cigarette smoking and alcohol consumption were the major risk factor for osteoporosis in elderly (Poor G 1997). The enlisted other causes include low body mass index, rheumatoid arthritis, hyper kyphosis, recurrent smocking, heavy alcoholism, immobilization and long term use of certain medications such as glucocorticoids, anticoagulants, anticonvulsants, aromatase, inhibitors, antineoplastic agents for cancer treatment and gonadotropin releasing hormone agonists (Gabdhi AB, 2005).

NEED FOR THE STUDY:

Osteoporosis has been labelled as the disease of the 21st century. In recent years osteoporosis has become a leading cause of morbidity and mortality among elderly women. The great risk is because of the sedentary nature and work option, modern Indians have hardly any exposure. Osteoporosis is a silent disease, because the most visible clinical sign is often the hip fracture. Urbanization and aging population cause a greater disease burden. The majority of fragility fracture patients are neither assessed nor given any treatment.

Worldwide, it is estimated that one in three women above the age of 50 will experience osteoporotic fracture as well as one in five men. The world health organization estimates the life time risk in a developed country for an osteoporotic fracture of hip, vertebrae, wrist at 30-40%. The "European prospective osteoporosis study" stated the prevalence of 15% in women aged 50-60 years and 45% in women older than 70 years. In men the prevalence was 2.4% at age 50 -60 years and 17% in men with over 70 years. In total number this sum up to an estimated 4-7 million people with osteoporosis in Germany (Unni J, 2010).

In Singapore, it is estimated that 800-900 hip fractures occur in yearly due to diseases. 51.40% Urban Malaysian women in her menopause age group has mild osteoporosis. In India one in three were suffering from osteoporosis (Unni J, 2010)India with a population of 1.2 billion people is the second most populated country in the world with approximately 10% of population over 50 years of age. In 2013, sources estimates that 50 million people in India are either osteoporotic (t score lower than -2.5) or have a low bone mass (t score between 1.0 to -2.5). A study by Nithin et al (2018) found that the prevalence of osteoporosis in men (40–75 years) to be 14.5% at LS and 4.7% at hip. A study by Lee *et al*. in Korean males found a prevalence of 5.7% at LS and 7.7% at FN, while another study in Chinese adults reported a prevalence of 6.4% at LS and 15.5% at FN in men above 50 years of age. Shetty*et al*. reported a prevalence of osteoporosis at LS (15.2%) and FN (10.7%) which is similar to our study findings.

Study shows that the prevalence of osteoporosis in Indian women 34% osteopenia, 8% of osteoporosis (2005) in Mumbai. (Rodica, 2013), 52% osteopenia and 29% osteoporosis in Hyderabad. In Jammu (2006) total sample of 158 women 36.79% osteopenia and 20.25% osteoporosis in female. (Sharma B, 2012). Another study conducted in Haryana (2007) the prevalence of osteoporosis in elderly women, totally 430 samples were under study results showed that 29% had osteopenia, and 62% had osteoporosis.(Babu AS,2009). In Pune (2010) the prevalence of osteoporosis, 31.4% osteopenia, 14.3% osteoporosis estimated in 105 samples. (Apoorva et al, 2018). In Delhi (2011) 1600 subjects, 44.9% had osteopenia and 42.5% with osteoporosis in women. (Limin T, 2017). A study in Delhi estimated the prevalence of osteoporosis as 24.6% in men and 42.5% in women above 50 years of age. (YkubSanga, 2018). Another study by Sharma *et al*. has reported a prevalence of 8.5% in the femoral neck region in men. In Kerala (2009) 609 women was under study, which shows 41% of osteopenia, 44% of osteoporosis.

Sequence of studies revealed that the risk factors are varying in number. All the observation made above the condition and its prevalence forced the researcher to select this topic. This study will help to identify the risk factors of osteoporosis and educate the public about the specific risk factors, to seek testing and treatment if required, in order to protect their future independence and promote quality of life.

STATEMENT OF THE PROBLEM

A prospective observational study to assess the prevalence and high risk factors of osteoporosis among elderly in selected hospitals of Idukki district, Kerala.

OBJECTIVES

- To assess the prevalence and risk factors of osteoporosis among elderly
- To determine association between prevalence and risk factors with selected variables.

REVIEW OF LITERATURE

Apoorva Dev et al (2018) conducted an observational study in Bengaluru, to assess the prevalence, risk factors to create an awareness of osteoporosis and to improve the Quality of life. The study results were out of which 185(43.12%) were male and 244(56.87%) were female. For male 26 (14.05%) were osteoporotic and 116(62.70%) were osteopenic and 43(23.24%) were normal category. In females, 45(22.13%) were osteoporotic, 145(59.42%) were osteopenic and 45 (18.44%) were normal.

Dana Hyassat et al (2017) conducted a cross sectional study to assess the prevalence of osteoporosis and osteopenia among Jordanian postmenopausal women with total of 1079 samples aged between 45 to 84 years was selected and they underwent BMD through DEXA (Dual Energy X-ray Absorptiometry). The prevalence of osteoporosis was observed at lumbar spine (32.4%), left femoral neck (14.4%) and the prevalence of osteopenia was (56.1%) in left femoral neck, and lumbar spine (41.3%). The factors strongly associated with osteoporosis with selected variables of menopausal duration, overweight, high parity, physical inactivity, inadequate sun exposure, and delayed menarche.

TianLimin et al (2015) conducted a cross sectional study on prevalence of osteoporosis in post-menopausal women and elderly men in Gansu Province, North-western of China. About 3359 post-menopausal women and 3205 elderly males were randomly selected and their BMD (g/cm2) was measured. By WHO criteria, the prevalence of osteoporosis in the entire study population was 9.65% for postnatal women and 8.08% for elderly males, the rate of osteopenia for postmenopausal women were 27.09% and elderly males were 26.28%. Risk of osteoporosis was significantly associated with age, menopause age, duration of menopause, BMI, alcohol consumption, exposure to sunlight and decreased physical activity.

MATERIALS AND METHODS:

This prospective observational study was carried out in orthopaedic OPD, of St. John's Hospital, Kattappana, Idukki district Kerala. 60 Samples were selected based on inclusion criteria and informed consent was taken prior to data collection. Demographic data was obtained by using self-structured questionnaire. Clinical data was gathered by the observer after assessing the participants. Height and weight taken and calculated BMI. As per WHO criteria samples were categorizes as normal, (t score +1 to -1) osteopenia (t score -1 to -2.5) and osteoporosis (t score < -2.5). Participants with normal t score excluded from this study. Percentage and association with BMD, of 46 samples data were analysed with SPSS version.20. Association was tested at p<0.05, (CI-95%).

RESULTS:

Figure 1. Frequency and percentage of selected variables-Age

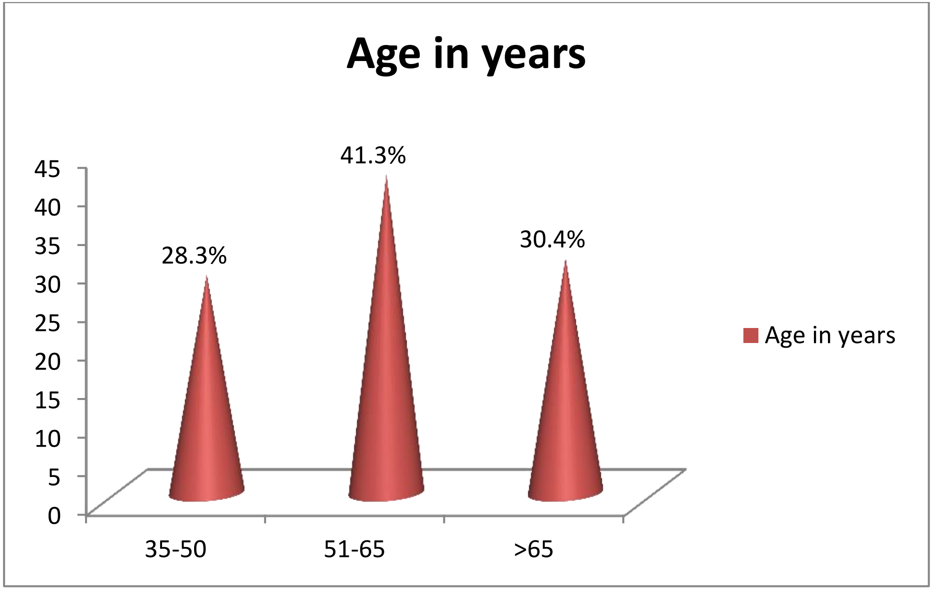

Figure 2. Frequency and percentage of sun exposure per day.

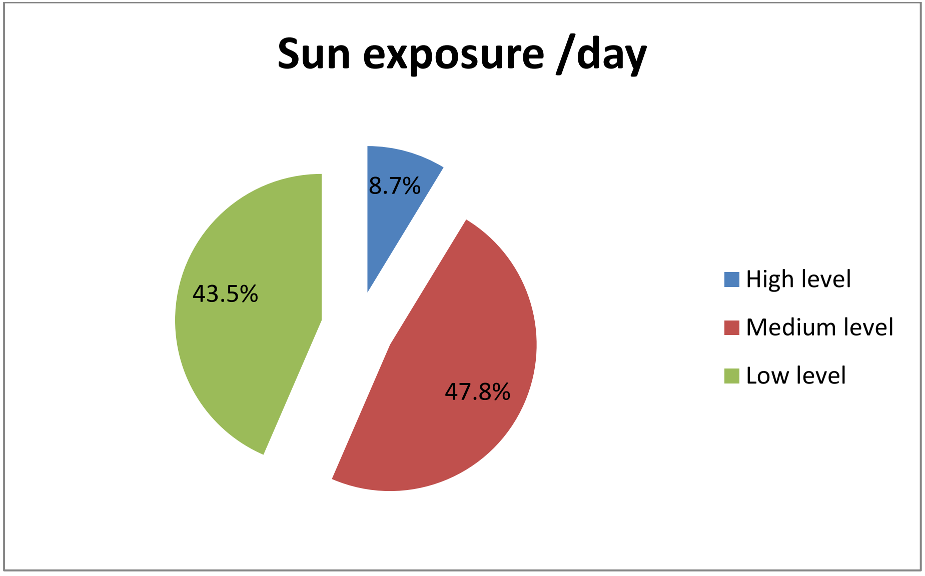

Figure 3. Frequency and percentage of Bone Mineral Density

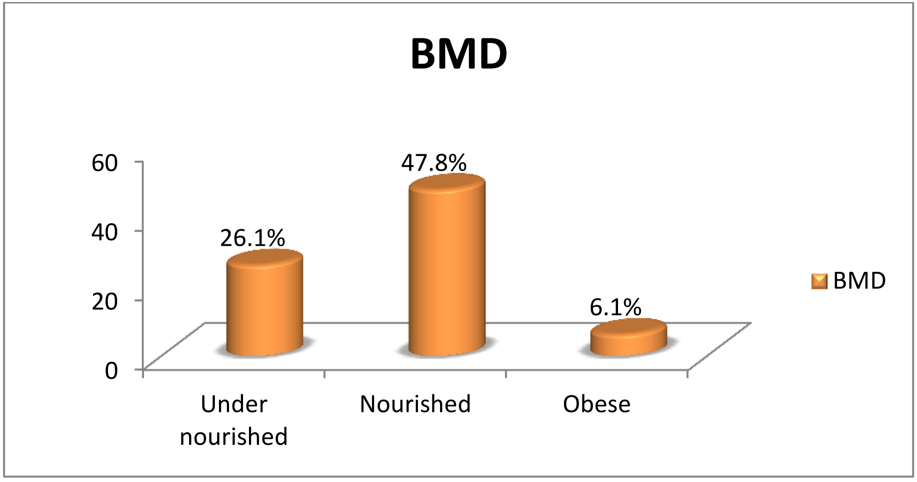

Table 1: Distribution of frequency and percentage of the variables

Sl no	**Variables**	**f**	**%**	**Sl no**	**Variables**	**f**	**%**
	Gender				**Diary intake per day**		
1	Male	**13**	**28.3**	**10**	Very little	20	43.5
	female	**33**	**71.7**		1-3 times a day	23	50.
					More than 3 times a day	3	6.5
	Marital status				**Alcohol**		
2	Married	39	84.8	**11**	Regularly	3	6.5
	unmarried	7	15.2		Occasionally	8	17.4
					Never	35	76.1
	Education				h**/o Menstruation**		
3	No formal education	17	37	**12**	premenopausal	11	33.3
	LP &UPS	17	37		post-menopausal	22	66.7
	HS & HSS	4	8.7				
	Degree	6	13				
	PG & Above	2	4.3				
	Religion: Christian	14	30.4		**Area of living**		
	Hindu	19	41.3		**Rural**	36	78.3
	Muslim	13	28.3		**Urban**	10	21.7
	Occupation				**Previous h/o fracture**		
5	Sedentary workers	14	30.4	**14**	Yes	26	56.5
	Agriculture	19	41.3		No	20	43.5
	Heavy workers	13	28.3				
	Type of family				**No. of delivery:** Nullipara	5	15.2
6	Joint family	4	8.7	**15**	1-3	11	33.3
	Nuclear family	42	91.3		>3	17	51.5
	Co-morbid illness				**Duration of menopause**		
7	DM	13	28.3	**16**	<5 years	2	6.1
	CKD	4	8.7		5-10yrs	7	21.2
	HT	10	21.7		>10yreas	15	45.5
	Hyperthyroidism	5	10.9		Others(pre group& male)	9	27.3
	Cardiac disease	2	4.3				
	others	12	26.1				
	H/o No. of falls: <3	17	37		**Family h/o fracture**		
8	3-5	12	26.1		Yes	22	47.8
	>5	17	37	**17**	No	24	52.2
	Physical exercise : Regularly	2	4.3		**Type of diet intake**		
9	Occasionally	28	60.9	**18**	Vegetarian	20	43.5
	Never	16	34.8		Mixed diet	26	56.5

Session 2. Association of BMD with demographic and clinical variables.

Sl No	Variables	X2	df	t- value	Sl No	Variables	X2	df	t- value
		n=46					n=46		
1	Age	**7.154**	2	5.99	15	Drugs	1.804	2	5.99
2	Gender	3.327	1	3.84	16	Physical exercise	6.497	2	5.99
3	Marital status	1.227	1	3.84	17	Dairy products intake	**21.014**	2	5.99
4	Religion	1.804	2	5.99	18	Sun exposure	**16.654**	2	5.99
5	Education	1.033	4	9.49	19	Alcohol	2.966	2	5.99
6	Occupation	1.804	2	5.99	20	Smoke	3.357	2	5.99
7	Type of family	**4.016**	1	3.84	21	Menstrual history	.063	1	3.84
8	Income per month	1.180	3	7.82	22	Duration of menopause	**8.215**	3	7.82
9	Area of living	1.627	1	3.84	23	No. of deliveries	1.248	2	5.99
10	Type of diet	.113	1	3.84	24	No. of falls	**14.981**	2	5.99
11	BMI	.247	2	5.99	25	Activity level	**13.457**	1	3.84
12	Previous h/o fracture	6**.972**	1	3.84	26	Hormone supplements	3.920	4	9.49
13	Family h/o fracture	0.095	1	3.84	27	Co-morbidities	4.799	5	11.07
14	Intake of Vit D &Calcium	**5.301**	1	3.84					

*Age, type of family, previous history of fracture, intake of calcium, Vit D, dairy products, sun exposure, duration of menopause, number of falls and physical activity level were associated with BMD. It was statistically significant. (CI-95%, P<0.05).

DISCUSSION:

In this present study findings statistically proved that age, (X^2-7.154,df 2) type of family, (X^2-4.016,df 1) history of previous fracture (X^2-6.978, df 1), poor consumption of dairy and Vit DX^2-21.104, df 2), less exposed sun light (X^2-16.654, df 2), inadequate physical activity (X^2-13.457, df1) and repeated falls (X^2-14.981, df 2) are associated with BMD at (p<0.05,CI 95%). Several studies are supporting the findings. Age & high duration of menopausal was associated with Osteoporosis (Lambrino, 2015). In female group consumption of alcohol was statistically significant (p 0.032), reported by Oliver, 2018. Diabetes and hypertension was associated with BMD (Leidig, 2014). Low BMI is associated with abuse of alcohol resulted osteoporosis. (Elinor A, 2016). DM HTN obesity, steroid usage, was associated with osteoporosis. Study proved that parity and obesity, history of fracture and poor physical activity were associated with Osteoporosis (Haideri, 2016).

CONCLUSION:

Universally osteoporosis in an elderly is the major health apprehension. Unawareness of this health issue can contribute to untreatable problems in their entire life. Present study findings show the proportion of osteoporosis and osteopenia in elderly is 52.2% and 47.8% respectively. The major risk factors associated with osteoporosis was age, type of family, deficient consumption of calcium, vitamin D, dairy products, lack of physical exercise, period of menopause, unexposed to sun light, increased parity. People with altered body mass index can cause either osteoporosis or osteopenia in both sexes. Researcher embraces the health education programmes and screening programmes through health camps to prevent further complications as a result of osteoporosis among elderly.

REFERENCES:

1. Antonio Herrera. Angel Antonio Martínez. Luis Ferrandez. Enrique Gil. Alonso Moreno .Epidemiology of osteoporotic hip fractures in Spain. International Orthopedics (SICOT) (2006) 30: 11–14 DOI 10.1007/s00264-005-0026-2.
2. Aliya A. Khan, Anthony B. Hodsman, Alexandra Papaioannou, David Kendler, Jacques P. Brown, and Wojciech P. Olszynski. Management of osteoporosis in men: an update and case example. CMAJ. 2007 Jan 30; 176(3): 345–348doi: 10.1503/cmaj.050816https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1780100/
3. Aggarwal N, Raveendran A, Khandelwal N, Sen R.K, Thakur J, Dhaliwal L.K, Manoharan S.R.R. Prevalence and related risk factors of osteoporosis in peri- and postmenopausal Indian women. Journal of mid-Life health. 2011; 2(2):81–85. http://dx.doi.org/10.4103/0976-7800.92537. [PubMed]
4. Apoorva Dev, L A Rama Manasa, Shraddha S Bayar, Sushmitha N Shetty. A Study to Create Awareness of Osteoporosis, To Determine its Prevalence and Associated Risk Factors. IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS) e-ISSN: 2278-3008, p-ISSN: 2319-7676. 2018, Volume 13(4). Issue 4 Ver. PP 53-66. DOI: 10.9790/3008-1304015366. www.iosrjournals.org,
5. Dana Hyassat, Taghreed Alyan, et al (2017). Prevalence and Risk Factors of Osteoporosis among Jordanian Postmenopausal Women Attending the National Center for Diabetes, Endocrinology and Genetics in Jordan. Biores Open Access.6 (1): 85–93.
6. Ejaz S, Mahmood A, Qureshi M, Ali M. Prevalence of osteoporosis and osteopenia among Pakistani pre and post-menopausal women. Journal of Dental and Medical Sciences (JDMS) 2012; 2(6):12–17.http://dx.doi.org/10.9790/0853-0261217.
7. Heidari B, Muhammadi A, Javadian Y, Bijani A, Hosseini R, Babaei M. Associated Factors of Bone Mineral Density and Osteoporosis in Elderly Males. Int J Endocrinol Metab. 2016 Nov 27; 15(1):e39662. doi: 10.5812/ijem.39662. https://www.ncbi.nlm.nih.gov/pubmed/28835759.
8. Jyoti Thulkar and Shalini Singh. Overview of research studies on osteoporosis in menopausal women since the last decade. Journal of mid-life health.J Midlife Health. 2015 Jul-Sep; 6(3): 104–107.doi: 10.4103/0976-7800.165589. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4604668/
9. Kadam NS, Chiplonker SA, Khadikar AV. Prevalence of osteoporosis in apparently healthy adults above 40 years of age in Pune. Indian Journal of Endocrinology, 2018, 62-73. https;//www.ijem.in/text.asp?2018/22/1/67/225003.